

## REMARKS

This Response is submitted in reply to the Office Action dated November 19, 2007. Applicants have amended claims 1, 2, 4, 6-13, and 17-22. New claims 97-101 have been added. The specification has been amended. No new matter has been added through such amendments. Enclosed is a Three Month Petition for Extension of Time to reply to the Office Action. Please charge Deposit Account No. 02-1818 for all fees due in connection with this Response.

The Office Action rejected claims 1 to 22 under 35 U.S.C. §103(a) as being unpatentable over United States Patent No. 5,677,836 to Bauer ("Bauer") in view of United States Patent No. 4,674,048 to Okumura ("Okumura"). Applicants respectfully disagree with such rejection.

The Office Action states that Bauer discloses "a second internal map of lower resolution (global environment map 3A, . . . ), wherein the global map is the larger environment map and room map . . . ." Bauer does not teach a second map of lower resolution. Bauer discloses an environment map UK that has two cell sizes. [Bauer, Col. 3, In. 40-44]. "cells of different sizes are used for producing the environment map, a smaller cell size being used in the proximity of the self-propelled mobile unit and a larger cell being used at amore of a distance from the self-propelled mobile unit." [Col. 2, In. 10-14]. Bauer explains "a smaller cell size is utilized in the proximity of the self-propelled mobile unit SE." [Col. 3, In. 46-47]. As a result, "A higher resolution in the perception of the environment is acquired in this way . . . ." [Col. 3, In. 47-48]. Additionally, "as a result of employing larger cells at a greater distance from the self-propelled mobile unit SE, a lower evaluation outlay is achieved." [Col. 3, In. 50-52].

Bauer does not disclose a second internal map having lower resolution, but a single map with different cell sizes affecting resolution. Additionally, Bauer's disclosure of a second map derived from a first map does not disclose creating a second map of lower resolution. For instance, Bauer discloses "the local environment map is derived from the global environment map by applying trigonometric functions using the rotational angle, being derived therefrom for an evaluation that affects a plurality of cells

of the environment map.” [Col. 2, ln. 25-29]. Thus, the second map in Bauer is not of lower resolution, but derived based on a rotational angle. For these reasons, Applicants respectfully submit that claims 1 and 12 (and claims 2, 4, 8, 9, 11, 12, 13, 15, 19, 20 and 22 which depend therefrom) are patentably distinguishable over Bauer and are in condition for allowance.

Okumura does not cure the deficiencies of Bauer. Okumura does not render obvious a second map derived from a first map. For the foregoing reasons, Applicants disagree with the rejection and respectfully submit that the rejected claims are in condition for allowance. Despite such disagreement, Applicants have elected to amend certain claims to advance the prosecution of the application.

Amended independent claim 1 recites a method of operating a robot cleaner, said method comprising: “(a) causing at least one wheel to move, wherein the wheel is coupled to a body including a cleaning unit; (b) causing the body to travel on a surface along a travel path, the surface being definable by a plurality of cells; (c) during the traveling: gathering data corresponding to each traveled cell and each non-traveled cell; at least partially cleaning the traveled cells; and storing the data, the stored data representing a map; (d) determining which part of the map has a highest percentage of non-traveled cells; and (e) changing the travel path based on the determination of step (d).”

Amended independent claim 12 recites “a robot cleaner comprising: a body including a cleaning unit; at least one wheel coupled to the body; at least one motor operatively coupled to the at least one wheel; at least one processor operatively coupled to the at least one motor; at least one input device operatively coupled to the at least one processor; at least one sensor operatively coupled to the at least one processor; and at least one memory device storing a plurality of instructions which are executable by the at least one processor to: (a) cause the at least one wheel to move thereby causing the body to travel on a surface along a travel path, the surface being definable by a plurality of cells; (b) during the traveling: (i) gather data corresponding to each traveled cell and each non-traveled cell; (ii) at least partially cleaning the traveled cells; and (iii) store the data, the stored data representing a map; (c) determine which

part of the map has a highest percentage of non-traveled cells; and (d) change the travel path based on the determination of step (c)."

New claim 97 recites "a robot cleaner comprising: a body including a cleaning unit; at least one wheel coupled to the body; at least one motor operatively coupled to the at least one wheel; at least one processor operatively coupled to the at least one motor; at least one input device operatively coupled to the at least one processor; at least one sensor operatively coupled to the at least one processor; and at least one memory device storing a plurality of instructions which are executable by the at least one processor to: (a) cause the cleaning unit to travel on a surface along a travel path; the surface defining a first map; (b) during the traveling: (i) gather data corresponding to traveled and non-traveled areas of the first map; (ii) at least partially clean the traveled areas; and (iii) store the data; (c) determine which part of the surface has a highest percentage of non-traveled cells; (d) use the stored data and the determination of step (c) to: (i) create a second map; and (ii) change the travel path.

Bauer and Okumura do not, separately or collectively, disclose the elements of the foregoing independent claims. In particular, these references do not render obvious determining a path for the robot cleaner based on which part of a map has a highest percentage of non-traveled cells. The robot in Okumura travels on a predetermined path. [Col. 4, ln. 42-43]. Although the robot in Okumura can identify the presence of a traveled block, there is no determination of the path based on this identification. Instead, the robot sequentially sweeps according to its predetermined pattern regardless of the traveled or untraveled regions. [See Col. 5, ln. 2-16; Col. 5, ln. 32-41; Col. 5, ln. 53-60]. The Office Action's combination does not render obvious such subject matter in which the robot cleaner travels along a surface gathering data corresponding to traveled and non-traveled cells in order to determine its path based on the gathered data.

The specification supports the foregoing amendments and new claims. For example, support can be found, among other places, in the following sections of the specification:

- “the internal map used by the robot cleaner can mark cells as obstacle, cleaned or uncleaned.” [0127].
- “When the robot cleaner cleans regions of the room, indications of the cleaned regions can be stored.” [0128].
- “With an internal map, the robot cleaner can potentially perform path-planning routines that it would otherwise be able to do.” [0130].
- “In one embodiment, the robot cleaner seeks out uncleaned regions. An algorithm can seek out areas of the map with the highest density of uncleaned cells.”
- “In one embodiment, a minimum number of unclean cells in a region are required before the robot will move to that region.” [0130].


For the foregoing reasons, Applicants respectfully submit that all of the claims are in condition for allowance.

An earnest endeavor has been made to place this application in condition for formal allowance and is courteously solicited. If the Examiner has any questions regarding this Response, Applicants respectfully request that the Examiner contact the undersigned.

Respectfully submitted,

BELL, BOYD & LLOYD LLP

BY



Renato L. Smith  
Reg. No. 45,117  
Cust. No. 29190

Dated: May 16, 2008